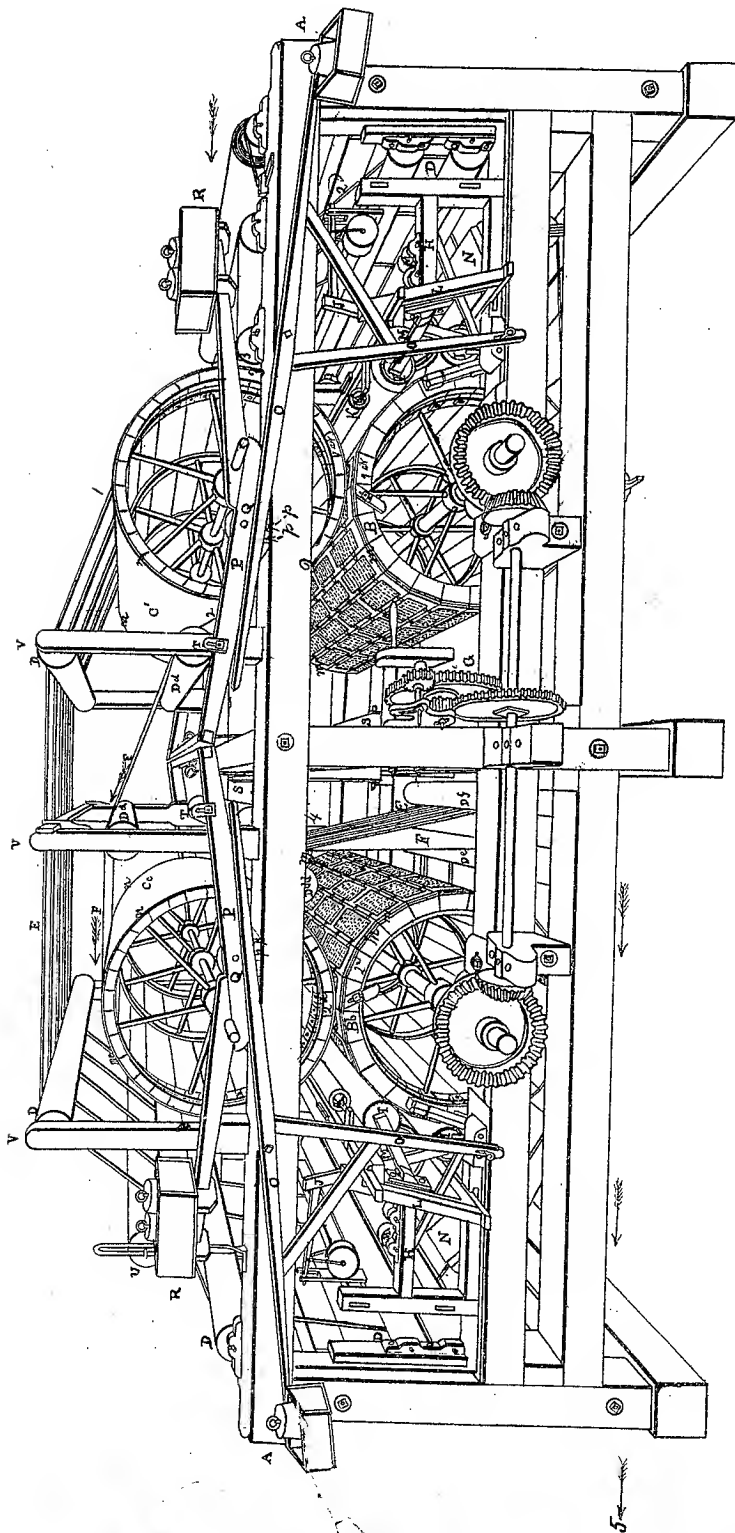
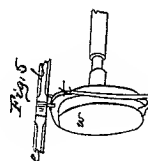
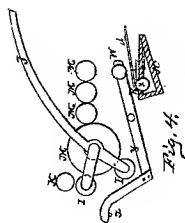
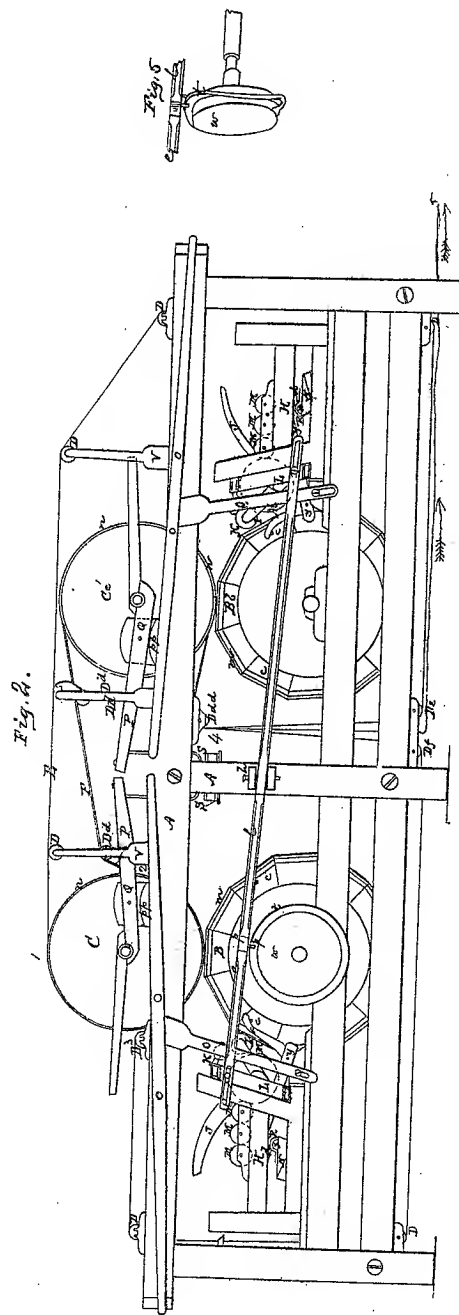
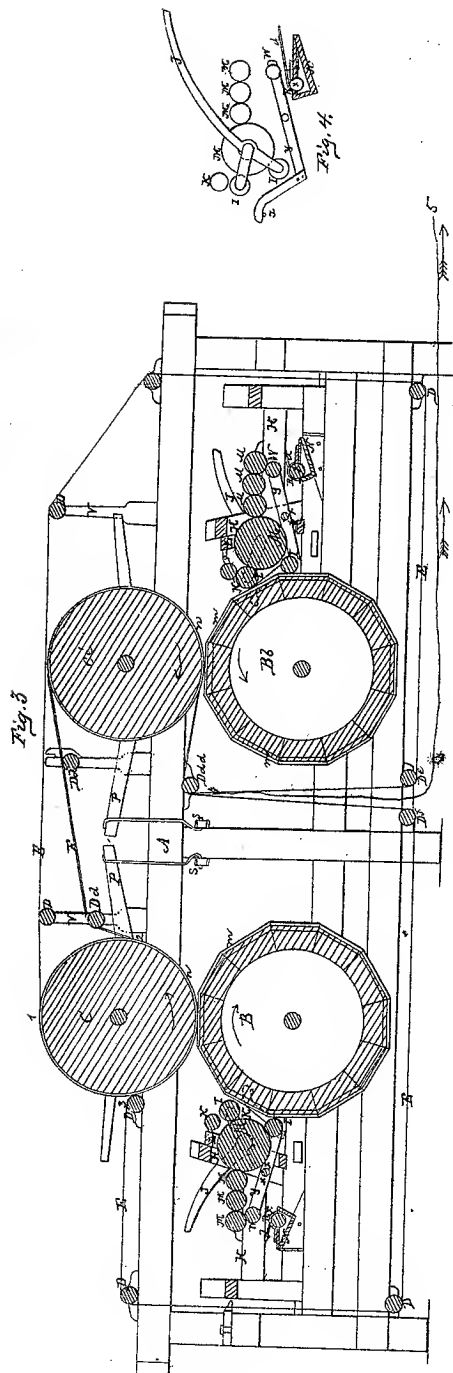


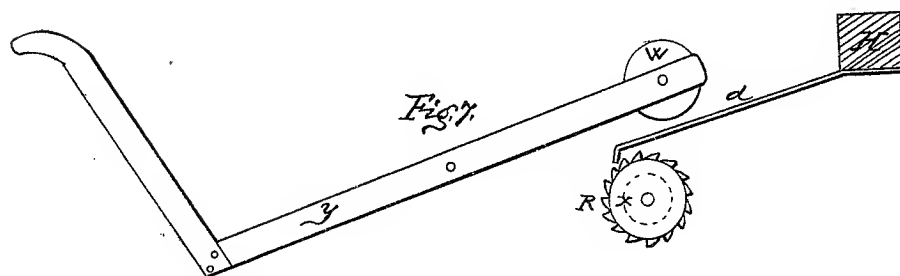
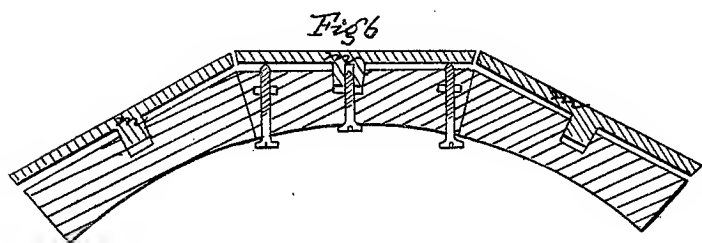
T. Trench. Sheet 1. 3 Sheets.
Printing Press.
Nº 468. Patented Nov. 20. 1837.



T. Trench. *Sheet 2.3 Sheets*
Printing Press.
Nº 108 *Patented Nov. 20. 1837*



T. Trench. Sheet 3. 3 Sheets.
Printing Press.
N^o 468. Patented Nov. 20. 1837.



UNITED STATES PATENT OFFICE.

THOMAS FRENCH, OF ITHACA, NEW YORK.

MACHINE FOR PRINTING BOTH SIDES OF A CONTINUOUS SHEET OF PAPER.

Specification of Letters Patent No. 468, dated November 20, 1837.

To all whom it may concern:

Be it known that I, THOMAS FRENCH, of the town of Ithaca, in the county of Tompkins and State of New York, have invented
5 a new and useful Improvement in Printing, being a machine for printing both sides of a continuous or web sheet of paper at one operation, which is described as follows, reference being had to the annexed drawings
10 of the same, making part of this specification.

The principal feature of this machine consists in a certain combination and arrangement of mechanism, by which a continuous
15 or web sheet of paper is printed on both sides, as it comes from an ordinary paper making machine, and is then conveyed to a common drying machine where it is dried, and from thence to a cutting machine where
20 it is cut into sheets; or it may be wound in a roller.

A, Figure 1, represents the frame, constructed of a size and strength sufficient to contain and support the several parts of the machine hereafter described. B, B, *b*, two
25 type cylinders made of any required diameter, upon which the stereotype plates or pages are secured, having a shaft passing through their centers turned true, of a uniform size, lying transversely across the
30 frame, and turning in boxes thereon; movable or stationary. On each shaft may be placed a number of concentric rings, with straight or curved arms extending from the
35 inner to the outer ring called spiders; the inner rings of the spiders are of an uniform size, that they may fit any shaft of the same diameter; but the outer rings may vary in diameter according to the size of cylinder
40 required.

The staves forming the cylinder are made of wood and fastened to the outer rings by buttons or any convenient or secure mode. Each stave is curved or concave on the side
45 toward the center of the cylinder to correspond with the curvature of the rings, and flat on the opposite side to receive the stereotype plates, or pages, which are secured thereon by clasps, screws, or other suitable
50 fastenings. Across each stave at each end is placed a plate of iron *m* or bearer about an inch wide and as thick as the stereotype plates or types, which bearers are secured to the staves by any suitable means so that they
55 can be raised or lowered to any degree re-

quired so as to allow of a lighter or stronger impression being given as occasion may require; the whole forming a polygonal rim or bearing around the type cylinder to regulate the pressure of the impressing cylinders C, C *c*. 60

There are two pressing cylinders C, C *c*, as well as two type cylinders B, B *b*. The second of the latter or B, *b*, is $\frac{1}{4}$ of an inch larger in circumference than the first B, in
65 order to stretch the paper, when passing through the machine, to keep it light and smooth. The two type cylinders B, B, *b*, may be geared together by cogged gearing in the manner represented at G; or by band
70 gearing in any convenient manner to cause them to move together. The plates or types are arranged on the outer surface of the cylinders B, B, *b*, so that they shall print both sides of the paper without destroying the
75 register.

C, C, *c*, the cylinders for giving the impression; these are made of wood or metal of the required diameter, and covered with a soft elastic substance for pressing the
80 paper against the types having around the same near each end a hoop *n* about $\frac{1}{16}$ of an inch thick to run on the bearings of the type cylinders to prevent the cylinders C, C, *c*
85 from pressing too hard on the type. The bearings of these cylinders are supported in a frame P, made to rise and fall when the pressing cylinders pass over the corners on the surface of the type cylinders B, B, *b*.

D, rollers for guiding the tapes and keeping them extended. 90

E, E, two systems of endless tapes, which pass around the cylinders C, C, *c*, and around the rollers D, which keep them extended; the first system of tapes passes
95 around three fourths of the first cylinder C; that is from the point No. 1 to the point No. 2; and the second system passes one half around the first cylinder C, that is, from
100 No. 3, to No. 2, and in contact with them; these endless tapes are so adapted in number and position as to fall between the pages of the printing, or on the margin; they remain in contact with the paper on both sides
105 of it during its passage through the machine, by which means the end of the paper being once received, or taken in between the two systems of endless tapes at the point No. 3 it will continue its motion along with the
110 tapes between the cylinders and through the

machine until the paper is brought into a situation to be printed on both sides, without destroying the register or coincidence of the pages on the opposite side of the sheet. The end of the sheet of paper is placed between the two systems of tapes on the first cylinder C, at point No. 3 and passes between the two first cylinders C, and B, and is printed on one side; it then passes over two rollers D, *d*, D *d*, and around and between the second cylinders C *c*, and B *b*, and is printed on the opposite side. Then the two systems of tapes leave the 2nd cylinder C, *c*, and separate, after passing over a roller D, *d*, the first system passing under a roller D, *e* placed nearly under the second cylinder B, *b*, and moving around and over the upper rollers D, and around the first cylinder C to No. 3, to receive the paper again. The second system of the tapes returns under a roller D, *f*, placed nearly under the first cylinder B, and around rollers D, and comes in contact with the paper on the first cylinder C, at No. 3, as before under the first system of tapes, and seizes the paper between the two systems in the manner above described.

F, F, the paper represented as passing from the first cylinder B, to the second cylinder B, *b*, to be printed on the other side, and after the paper is printed on both sides and leaves the second cylinder C, *c*, it leaves the two systems of tapes at No. 4 and is carried to a drying machine in the direction indicated by the arrows at No. 5, where it is to be dried.

G, Fig. 1, arrangement of cog wheels or gearing to operate the type cylinders. Bands and pulleys may be substituted for said gearing. H frames for holding the ink boxes and inking rollers which are moved toward or from the type cylinders by the levers O. Said frames sliding on the main frame A. I composition rollers for putting the ink on the types. These rollers have their bearings turning in boxes in levers J through which pass the bearings of the large roller M, so that they rise and fall by the action of the corners of the type cylinders upon them—they touch and take the ink from the roller M. The rollers I are moved by the friction from their ends turning on the iron plates on the ends of the staves, and the roller M, is moved by said rollers I and so on. J, one of the levers for pressing the ink rollers I against the types.

K, distributing roller for taking the ink from the upper roller I when it runs between the pages, having a vibrating motion which spreads the ink on the said roller, from whence it passes to the types: the bearings of roller K, run in two loose arms that rise and fall with the roller I, said arms being attached to the vibrating frame L.

The frame L is fastened to the levers C, Fig. 2 rear view and this lever by a joint or hinge *h* to the middle of the frame A, Fig. 2, and said lever runs over a spiral thread *t*, Figs. 2, 5, fastened on the periphery of a wheel *wa*, on the end of the shaft of one of the type cylinders, so that when the cylinder with the spiral thread *t* moves around, the lever vibrates backward and forward and the end of the lever being attached to the frame L Fig. 1, moves it likewise backward and forward; and the distributing roller K being fastened to said frame L also vibrates at the same time, by which the ink is spread, or distributed, on roller I; said frame L moving endwise on frame H.

N, Figs. 1, 2, 3, 4, box for containing the ink, fastened in the frame H, with a metallic roller X, Fig. 4 turning in the same, one-half immersed in the ink contained therein, with a piece of iron placed in the ordinary mode to scrape the ink from the roller, and suffer as little or as much to pass on to it, as is required. One end of the gudgeon of this roller there is a ratchet wheel R. When the roller W that takes the ink from the metallic roller X moves down on it, a spring dog (*d*) attached to frame H catches in the ratchet wheel and moves it around and brings up a supply of fresh ink for the roller W, to take off and spread on the rollers M, that supply the inking rollers I. The roller W that takes the ink from the metallic roller X, has its bearings running in the ends of parallel levers Y, Figs. 2, 3 and 4, that move on bolts inserted in the frame H. These bolts or fulcra are inserted through the levers Y into frame H, in such manner as to let the roller W rise and fall when taking ink from the metallic roller X; said roller is again carried down to roller X by pins or cams *c*, Fig. 11, fastened to the ends of the type cylinders which catch the end of the lever Y at *x* and raise it up, and at the same time depress the roller W to receive the ink; it is then made to rise up to rear roller M, of the rollers that supply the ink rollers I by the gravity of the longer end *x* of the lever Y, to which lever roller W, is suspended—the fulcrum being at X *x* Fig. III.

O, Figs. 1 and, 2 levers for pressing the frame with the inking rollers up to the types having a box at the end thereof in which to place weights for giving a stronger or lighter pressure. P, frames for the bearings of the cylinders C to turn in moving on pins or fulcra in standards *p p* of the main frame. R, boxes at the ends of these levers to place weights in to press the cylinders C, more or less on the type. S, levers and rods for raising the cylinders C off the type cylinders when the paper has to

pass through, the levers moving on pins inserted in the main frame and the rods extending from them to the frames P.

The operation is as follows: When the frame, P, is brought down by the lever rod, S, in order to raise the impressing cylinders from the type cylinder, the projection T, comes in contact with the longest end of lever D, depresses it, and at the same time pushes the other end of said lever with the frame H and inking rollers from the type cylinder. U, stands with slots in them to admit the gudgeons of a roller running on the tapes and to suffer the roller to rise and fall in order to keep them tight.

From the foregoing description it will be seen that the distinguishing character of this machine consists—

1. In the method of printing both sides of a continuous sheet of paper at one operation, by taking the sheet as it comes from a common paper making machine, and passing one end of the continuous sheet between the systems of tapes at the points marked No. 3, and, (the machine being set in motion) causing it to pass between the first pressing cylinder C, and type cylinder B, where it is printed on one side; and then over the rollers D and around and between the second pressing cylinder C, c, and the second type cylinder B, b, where it is printed on the other side; and then over the roller (D d) down between the rollers D e and D f onward in the direction of the arrows to a drying machine, or to a roller on which it may be wound, ready for being cut into sheets.

2. The method of inking the type cylinders by a combination and arrangement of rollers, inking and distributing rollers, ink box, levers, and some other parts before described, in the frame H, which is brought toward or receded from the type cylinder by aid of the levers O, the ink being taken from the ink box, and distributed on the rollers M by means of the pins c in the end of the type cylinder B coming in contact with the end of the lever Y, and raising this end and depressing the other end, with

the roller W upon the metallic roller X in the ink box from which it takes ink—the lever at the same time pressing upon the spring dog d, which works in the ratchet wheel f, on the end of the metallic roller X, causing it to turn and bring up a fresh supply of ink from the box—the cam or pin e having passed the end of the lever Y the latter falls by its superior gravity, being the longest end, and raises the roller W with its supply of ink, against one of the composition rollers M to which it imparts its supply of ink. The several rollers M convey the ink to the inking rollers I which are alternately brought in contact with the front roller M, by the angles of the type cylinders during their revolutions; from which roller they receive ink and convey the same to the type cylinder—the ink being distributed by means of the distributing roller K attached by vertically moving arms to a horizontal sliding frame L, having a transverse movement in the frame H effected by a vibrating lever (l) attached by one of its ends to the sliding frame L, its other end being attached by a pin to the side of the main frame, on which pin it vibrates, the vibratory movement being produced by a wheel w with a spiral thread t on its periphery working between pins or projections p p on the under side of the lever l, said wheel w, being placed on the end of the axle of one of the type cylinders.

The invention claimed and desired to be secured by Letters Patent consists in—

The combination and arrangement of the several parts of the before described machine for printing both sides of a continuous sheet of paper at one operation, whether effected in the manner herein set forth, or in any other substantially the same in principle.

In testimony whereof I hereunto subscribe my name before two witnesses.

THOMAS FRENCH.

Witnesses:

RICHD. P. CLARK,

A. E. BARNABY.